

# Awareness about Ban on Single-use Plastic Items among Nursing Professionals: A Cross-sectional Survey

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## ABSTRACT

**Introduction:** The government hospitals work round the clock and huge single-use non biodegradable plastic materials are used by patients, their attendants, staff and the public at large for their day-to-day activities. Therefore, awareness among the healthcare workers is essential for the full implementation of the policy of ban on single-use plastic items.

**Aim:** To study the awareness regarding ban on single-use plastic items among nursing professionals.

**Materials and Methods:** The present study was a cross-sectional study done on nursing professionals across all seniority and from various specialty departments. Overall, 550 nursing professionals were included in the study. A pretested questionnaire, comprising 16 questions, was used as a study tool. Chi-square test was applied for studying the significant association among different variables.

**Results:** The response rate was 91% i.e., out of total 550 nursing professionals 498 participated in the study. It was observed that 37.4% of participants were in the 31-40 years age group, 95% were females, 90.6% were married and 90.4% were from the urban area. It was found that the mean knowledge score of three knowledge questions (mean=1.120, SE=0.032, SD=0.715, 95% CI=1.057-1.183) was higher among females, unmarried staff and respondents with a rural background. Primarily, majority of the nursing staff (i.e., 82%) had learned about the ban on single-use plastic from television and newspaper rather than formal teaching/training.

**Conclusion:** The hospitals should start regular formal teaching/training programme for increasing awareness of healthcare workers regarding ban of single-use plastic items. Thus, it is relevant to address this issue through well-planned formal training sessions.

**Keywords:** Healthcare workers, Knowledge, Non biodegradable

## INTRODUCTION

The United Nations has defined single-use plastic as items planned to be used not more than one time before they are thrown away or reprocessed. The plastic bags were used for the first time in 1970's and became popular due to their low cost and proximity to use [1]. Around 500,000 million plastic bags are used every year all over the world [2,3]. Most of them are thrown out after single use and they can persist for about 1000 years in our atmosphere leading to great challenge [4,5]. The plastic baggage disposed off in surroundings leads to numerous challenges like deteriorating of natural magnificence of environment, the demise of flora and fauna [6]. In a study, it was revealed that the common cause for injury to the surroundings from plastic bags was due to lack of appropriate waste management and awareness about its injurious outcome [7].

In the contemporary period the plastic is seen universally in surroundings, hence the awareness to decrease the injurious impact of plastic waste has increased [8,9]. The United Nations Environment Programme (UNEP) has stated that only 9% of the nine billion tons of plastic produced around the world have been reprocessed and the bulk of the plastic waste has been dumped in the environment [10]. The UNEP has also predicted that if a similar trend is continued then by 2050 there will be around 12 billion tons of plastic litter in the atmosphere.

The government hospitals work round the clock and huge single-use plastic materials are used by patients, their attendants, staff and the public at large for their day-to-day activities. Therefore, awareness among the hospital staff is essential for the full implementation of the policy of ban on single-use plastic items. Every medical organisation needs to keep its health professionals updated about the ban on single-use plastic.

With this background in mind, this study was planned for nursing professionals posted in various specialty and super specialty

departments for assessing their awareness about the ban on single-use plastic, so that the future need for training (if any) may be assessed and the hospital campus may be made plastic-free.

## MATERIALS AND METHODS

The present study was a cross-sectional survey conducted at a tertiary care, academic, research, and referral hospital of Haryana, India. PGIMS, Rohtak, Haryana, India, is 2050 bedded set up with an average of 7000 per day outdoor patients and around 330 new indoor admissions per day. This study was carried out in the month of April and May, 2021 after obtaining approval from Institute Ethical Committee (IEC) vide letter dated 5.3.2021.

**Inclusion criteria:** All selected nursing professionals from various departments were included in the study.

**Exclusion criteria:** Those who failed to furnish the informed consent and did not response even after third weekly reminders were dropped from the study.

The study population consisted of nursing professionals working in various specialties and super specialties. As it was a cross-sectional study, hence 50% (i.e., n=534 and a round of 550) of the nursing personnel on the roll of the institute were included. The nursing professionals also supervise the work of various housekeeping and other staff working in their areas. The sampling frame was prepared by obtaining their names from different departments. By following a convenient sampling technique, requisite numbers of participants were selected from each department.

## Study Tool

A self-administered questionnaire was prepared after an extensive literature review and used as a study tool. The questionnaire was pilot, tested among 20 different experts for checking its validity. Thereafter, as per the inputs received during pilot testing, the

questionnaire was modified. The questions in this tool included those on socio-demographic variables, awareness about various aspects relating to the ban of single-use plastic. The questionnaire consisted of 16 questions for assessing the awareness regarding a ban on single-use plastic- three questions regarding general overview of the study topic, three questions regarding knowledge assessment of participants and eight questions were for assessing their perception related to various aspects of a ban of single-use plastic. The three knowledge-based questions were scored and each correct question was given one mark and each incorrect question was given a score of zero. Informed consent from the selected nursing professionals was taken individually and they were given the questionnaire to fill at their earliest available time, preferably within a week. The participants who failed to fill the questionnaire in one week's time were reminded once every week, until a maximum of three times, to get the filled questionnaire back. Participants who still failed to respond were dropped and the next participants were chosen from the list by convenient sampling technique.

## STATISTICAL ANALYSIS

The data were collected and entered into an excel sheet. Various statistical tests, viz., descriptive tests, Chi-square ( $p < 0.05$ ), one-way Analysis of Variance (ANOVA), Independent t-test were used, and category-wise subgroup analysis was done to generate the hypothesis on whether knowledge differential exists among nursing professionals at different levels, viz., staff nurses, nursing sisters, etc., The International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) 20.0 version was used for data analysis.

## RESULTS

The response rate was 91% i.e., out of a sample size of 550 nursing professionals, 498 filled questionnaires were received. The age, gender, marital status, and place of residence-wise distribution of the respondents are given in [Table/Fig-1]. It was observed that 37.4% of participants were in the age group of 31-40 years, 95% were females, 90.6% were married and 90.4% were from the urban area. It was found that the participants had mean length of service/ experience of 12-20 years ( $SD = 10.7704$ ).

Parameters		N (%)
Age group (years)	20-30	169 (33.9)
	31-40	186 (37.4)
	41-50	62 (12.4)
	51-60	72 (14.5)
	61-70	9 (1.8)
Gender	Male	25 (5)
	Female	473 (95)
Marital status	Married	451 (90.6)
	Unmarried	47 (9.4)
Place of residence	Urban	450 (90.4)
	Rural	48 (9.6)
Department/Place of posting	Medical wards	222 (44.5)
	Surgical wards	202 (40.6)
	ICUs	45 (9.1)
	Miscellaneous departments	29 (5.8)

[Table/Fig-1]: Distribution of sample size as per socio-demographic profile.

On question-wise analysis [Table/Fig-2], it was found that the majority (91.4%) of them were not aware of the date on which the use of single-use plastic was banned in the state of Haryana. Most of them (69.3%) were aware of the name of the first state to implement a ban on plastic and polythene baggage in India. Nevertheless, 66% of the respondents were not aware of the exact penal action for non violation under the Haryana Non Biodegradable Garbage (Control) Act, 1998.

Statement/Question		Count (N%)
Have you ever heard about ban on single use plastic?	Yes	497 (99.8)
	No	1 (0.2)
Source of information about it? (n=497)	Television	238 (47.8)
	Newspaper	171 (34.3)
	Colleagues	45 (9.1)
	Office orders	43 (8.6)
	Closed user group SMSs	0
Plastic bags are harmful to the environment	Strongly disagree	19 (3.8)
	Disagree	2 (0.4)
	Don't know	6 (1.2)
	Agree	161 (32.3)
	Strongly agree	310 (62.3)
I am open to the idea of using reusable bags.	Strongly disagree	22 (4.4)
	Disagree	31 (6.2)
	Don't know	9 (1.8)
	Agree	256 (51.4)
I prefer reusable bags with attractive designs	Strongly disagree	180 (36.2)
	Disagree	67 (13.5)
	Don't know	28 (5.6)
	Agree	273 (54.8)
*From which date ban on single use plastic is implemented in Haryana?	Incorrect	91 (18.3)
	Correct	455 (91.4)
*Which is the first state to implement ban on plastic and polythene bags in India?	Incorrect	43 (8.6)
	Correct	455 (91.4)
*Under the Section 11 of the Haryana Non Biodegradable Garbage (Control) Act, 1998, the Shopkeeper, vendor, wholesaler, seller, manufacturer etc. whoever violate the law will be liable	Incorrect	153 (30.7)
	Correct	345 (69.3)
Have you attended any awareness drive/ sensitising workshop on the harmful impacts of single-use plastics?	Incorrect	328 (65.9)
	Correct	170 (34.1)
Do you think society have enough information about dangers of plastic use	Yes	178 (35.7)
	No	320 (64.3)
Do you think after implementation of ban on single-use plastic there will be improvement in environment conditions	Yes	164 (32.9)
	No	210 (42.2)
	Can't say	124 (24.9)
How would you feel as the Government banned the use of plastic carrier bags?	Yes	445 (89.4)
	No	33 (6.6)
	Can't say	20 (4.0)
Why would you not use reusable shopping bags?	It doesn't bother me	13 (2.6)
	I don't think that a ban is necessary, they only need to make the bags degradable	95 (19.1)
	I think it's a great solution	390 (78.3)
Do you support the use of fabric bags as opposed to plastic ones?	They are too expensive	53 (10.6)
	I forget to take them when shopping	134 (26.9)
	They are not the suitable size for my amount of shopping	63 (12.7)
	No reason	248 (49.8)
Do you support the use of fabric bags as opposed to plastic ones?	Yes	474 (95.2)
	No	15 (3.0)
	Undecided	9 (1.8)

Write your suggestions or ideas about effective ways of solving the problem of plastic on the environment.	Produce less plastic things	166 (33.3)
	Recycle things	151 (30.3)
	Use plastic things that can be used over and over	55 (11.1)
	Teach the people to recycle	126 (25.3)
How often would you say you take reusable bags when you go shopping?	Never	58 (11.7)
	Sometimes	154 (30.9)
	Most of the time	159 (31.9)
	Always	127 (25.5)

**[Table/Fig-2]:** Statement/Question wise analysis of responses. Questions/ Statement No. 6, 7 and 8 were scored

The mean of knowledge score (Mean=1.12, SE=0.032, SD=0.715, 95% CI=1.057-1.183) increased with an increase in age upto 31-40 year age group and then it showed a declining trend. But this difference in mean knowledge score with various age groups was not statistically significant (p-value=0.474). It was found that the mean knowledge score was higher but not significant among females (p-value=0.564), unmarried staff (p-value=0.175) and respondents with rural background (p-value=0.638) [Table/Fig-3].

Variable	Parameter	N	Mean±Std. deviation	F-statistic	p-value*
Age group (years)	20-30	169	1.10±0.65	0.882	0.474
	31-40	186	1.17±0.77		
	41-50	62	1.12±0.66		
	51-60	72	1.06±0.73		
	61-70	9	0.77±0.67		
Gender	Male	25	1.04±0.61	-0.576	0.564
	Female	473	1.12±0.72		
Marital status	Married	451	1.10±0.71	-1.357	0.175
	Unmarried	47	1.25±0.73		
Place of residence	Urban	450	1.11±0.73	-0.469	0.638
	Rural	48	1.16±0.55		

**[Table/Fig-3]:** Association of mean knowledge scores with age group, gender, marital status and place of residence. \*one-way ANOVA was applied for age group variable and Independent Sample t-test was applied for gender, marital status and place of residence variable

It was revealed that 99.8% of the respondents stated that they have heard about the ban on single-use plastic. However, 64.3% of them had stated that they have not attended any awareness drive/sensitising workshop on the harmful impacts of single-use plastics. A 47.8% of the respondents have cited television and 34.3% have stated newspapers as their source of information. However, 32.9% of respondents agreed, 42.2% disagreed and 24.9% didn't comment on the issue of whether the public had enough information about the dangers of plastic and this statement had a statistically significant association with the age group of the respondents (p-value=0.015). It was discovered that 94.5% of the participants agreed or strongly agreed that plastic bags are harmful to the environment. Similarly, 87.6% of the respondents agreed or strongly agreed that they were open to the idea of using reusable bags. This statement has a statistically significant association with the respondent's place of residence (p-value=0.030). Similarly, 57.4% of the respondents stated that they carry reusable bags with them during shopping (p=0.037). However, 73% of the participants stated that they will prefer reusable bags with attractive designs. An 89.4% of the participants agreed that environmental conditions will improve after the implementation of a ban on single-use plastic. A 95.2% of respondents opined that they will support the use of fabric bags as opposed to plastic ones. This statement had statistically significant association with age group (p-value=0.040) and gender (p-value=0.017). A 33.0% of the

respondents suggested that less production of plastic items and 30.0% suggested that recycling of plastic items is an effective way of resolving the problem of plastic in the atmosphere. This statement had statistically significant association with age group (p-value=0.01) and gender (p-value=0.09) [Table/Fig-4].

Association between age group and knowledge regarding enough information about dangers of plastic use						
Age group (in years)	Yes	No	Can't say	Chi-square value=18.973 p-value=0.015*		
20-30	41 (24.3%)	84 (49.7%)	44 (26.0%)			
31-40	62 (33.3%)	80 (43.0%)	44 (23.7%)			
41-50	23 (37.1%)	24 (38.7%)	15 (24.2%)			
51-60	34 (47.2%)	19 (26.4%)	19 (26.4%)			
61-70	4 (44.5%)	3 (33.3%)	2 (22.2%)			
Association between age group and gender with their willingness to use the fabric bags						
Age group (in years)	Yes	No	Can't say	Chi-square value=16.139 p-value=0.040*		
20-30	154 (91.1%)	9 (5.3%)	6 (3.6%)			
31-40	183 (98.4%)	2 (1.1%)	1 (0.5%)			
41-50	57 (91.9%)	4 (6.5%)	1 (1.6%)			
51-60	71 (98.6%)	0	1 (1.4%)			
61-70	9 (100.0%)	0	0			
Gender	Yes	No	Can't say	Chi-square value=8.105395 p-value=0.017		
Male	428 (84.0%)	14 (8.0%)	8 (8.0%)			
Female	46 (95.8%)	1 (2.7%)	1 (1.5%)			
Association between place of residence and their opinion of using reusable bags						
Place of residence	Strongly disagree	Disagree	Don't know	Agree	Strongly agree	Chi-square value=10.708 p-value=0.030*
Urban	20 (4.4%)	23 (5.1%)	9 (2.0%)	234 (52.0%)	164 (36.4%)	
Rural	2 (4.2%)	8 (16.7%)	0	22 (45.8%)	16 (33.3%)	
Association between age group, gender and their ideas about effective ways of solving the problem of plastic on the environment						
Age group (years)	Produce less plastic	Recycle things	Multiple use of single plastic	Teach the people to recycle	Chi-square value=25.454 p-value=0.012*	
20-30	50 (29.6%)	47 (27.8%)	28 (16.6%)	44 (26.0%)		
31-40	52 (28.0%)	70 (37.6%)	16 (8.6%)	48 (25.8%)		
41-50	23 (37.1%)	15 (24.2%)	6 (9.7%)	18 (29.0%)		
51-60	36 (50.0%)	16 (22.2%)	5 (6.9%)	15 (20.9%)		
61-70	5 (55.6%)	3 (33.3%)	0	1 (11.1%)		
Gender	Male	Female	Chi-square value=6.473 p-value=0.090*			
Male	4 (16.0%)	8 (32.0%)	6 (24.0%)	7 (28.0%)		
Female	162 (34.2%)	143 (30.2%)	49 (10.4%)	119 (25.2%)		
Association between place of residence and attitude to use reusable bags while going for shopping						
Place of residence	Never	Sometimes	Most of the time	Always	Chi-square value=8.453 p-value=0.037*	
Urban	53 (11.8%)	140 (31.1%)	150 (33.3%)	107 (23.8%)		
Rural	5 (10.4%)	14 (29.2%)	9 (18.8%)	20 (41.6%)		

**[Table/Fig-4]:** Perceptions of nursing professionals about various aspects related to ban of single use plastic. \*A p-value <0.05 was considered to be statistically significant

## DISCUSSION

All healthcare workers must fully understand the regulations regarding a ban on single-use plastic items. However, not many studies are available on this topic in the indexed literature, particularly in the

hospital setting. Hence, this study was conducted among nursing professionals in a tertiary care academic, research and referral hospital of Northern India to map their knowledge and attitude and practice perceptions about a ban on single-use plastic. This study found that 99.8% of the participants were aware of the ban of single-use plastic and 47.8% of respondents have cited television and 34.3% have stated newspapers as their source of information. This finding conformed to the findings of Tamil Nadu study, where 94% of participants were aware of the plastic ban legislation and 42% of participants came to know about this through television/radio and newspaper (24%) [11]. However, the finding of this study showed a better knowledge score among the nursing professionals as compared to the study carried out at Manglore, Karnataka, India, [12] which was conducted among the adult members of selected households. They reported that 15% of the respondents were not aware of the legislation regarding ban of plastic use. The better score/awareness among nursing professionals in the current study compared to Tamil Nadu [11] and Manglore [12] study may be attributed to the fact that nursing professionals were more educated than the study participants of these studies.

This study has generated some significant differentials in the knowledge scores. In present study, three questions were asked for evaluating the knowledge score of participants regarding different aspects related to the ban of single-use plastic in the state. It was revealed that the mean knowledge score increased with the increase in age up to the 31-40 year age group, and then it showed a declining trend. The decline in mean knowledge score with increasing age could be due to the difference in the sample size. It was also found that the mean knowledge score was higher among females, unmarried staff, and respondents with rural backgrounds. None of these subcategories had a statistically significant difference in mean knowledge score (i.e., p-value >0.05). This difference in knowledge score can also be attributed to the different sample size among subcategories.

In this study, the perceptions of the nursing professionals about the ban on single-use plastic implementation and the actions that should be taken to protect themselves and the environment from the hazardous effect of plastic was also studied. It was found that, 33% of respondents believed that society has enough information about the dangers of plastic use. The finding was slightly lower than the finding of the Tamil Nadu [11] and Manglore [12] study where 80% of selected urban residents and 85% of the adults from selected households were aware that plastic bags are injurious for health. Similarly, the finding of current study was also lower than a few other studies [13-16], where merely 50-70% of the respondents were aware of injurious health risks of using plastic. This finding reflects that there is a need to increase awareness among healthcare workers about the injurious effect of plastic on human health. In this study, 94.6% of respondents stated that plastic bags are harmful to the environment and this finding was in conformity with the finding of a study conducted at California [13] where 93% of respondents were aware of the harmful effect of plastic on the environment. This reflects that present study participants being healthcare workers had very good knowledge regarding the negative impact of single-use plastic on the environment. Similarly, 87.6% of the respondents agreed or strongly agreed that they were open to the idea of using reusable bags. It reflects that respondents have a positive attitude toward using non plastic eco-friendly alternatives which in turn will reduce the use of plastic bags tremendously. This finding got support from the study [17] carried out in China, where a drastic reduction in plastic use was observed after its ban. The positive attitude of nursing professionals towards non plastic eco-friendly alternatives will also help in educating the subordinate staff, patients and their attendants about its use. However, on the other hand the Ethiopia [16] study found that 77% of participants continued using plastic bags even after the ban. These findings suggest that there is a need

to increase awareness along with behavioral changes among the participants. In the present study, 57.4% of the respondents stated that they carry reusable bags with them during shopping and 95.2% of respondents opined that they will support the use of fabric bags as opposed to plastic ones. This reflects that participants were more inclined towards using fabric bags among the different eco-friendly alternatives. Similarly, in a study from Tamil Nadu [11], it was observed that respondents shifted to eco-friendly alternatives.

The category-wise analysis and differences generated in the study should be absorbed with caution. Yet, this explorative study has shed several significant clues for more investigation and interferences. Primarily, the nursing staff has learned about the ban on single-use plastic from television and newspaper rather than formal teaching/training. Thus, it is relevant to address this issue through well-planned formal training sessions. Besides, a system of systematic audits should be established to document whether healthcare workers are correctly implementing the policy of ban of single-use plastic as per guidelines.

The most significant strength of present study is its novelty. Though few studies are available regarding the ban of single-use plastic in indexed literature none of these studies were carried out in a hospital setting. Hence, this was a novel study regarding the ban on single-use plastic in healthcare workers in a big hospital setting. Also, the sample size was representative of nursing professionals across different levels of seniority and age group working in a tertiary care medical college hospital. It is also pertinent to mention here that although authors have conducted a study only on one category of healthcare workers, the sample size of present study was even more than the sample size of few studies available in the literature. Therefore, it will serve as an important yardstick regarding awareness about a ban on single-use plastic items among the nursing professionals of a tertiary care medical college hospital.

### Limitation(s)

There were some significant limitations with present study like it was a single centre-based study and other multiple centres were not evaluated. Secondly, only one category of healthcare workers i.e., nursing professionals was included in the study, and hence the findings of this study cannot be generalised to all categories of healthcare workers.

### CONCLUSION(S)

This study has given insight into various domains of the ban on single-use plastic regulation where nursing professionals performed well and the study participants were not aware of the exact penal action for non violation under the Haryana Non Biodegradable Garbage (Control) Act, 1998. The knowledge about these rules is indispensable; hence gap areas need to be addressed on a priority basis. Training at regular intervals should be held so that nurses across all levels of seniority can learn about them. The healthcare workers are more aware of biomedical waste (Management and Handling) rules and the regulation regarding the ban of single-use plastic is comparatively new to them. Therefore, it is recommended that all biomedical waste and general solid waste management training programs should also include training on awareness about the ban of single-use plastic.

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